

**STATEMENT OF BASIS**  
(for Proposed Permit Limits (New Permit))

PERMITTEE: Belgrade Commercial Park Corp.

PERMIT NUMBER: MTX000136

RECEIVING WATERS: Class I Ground Water

**FACILITY INFORMATION**

Name: Belgrade Gardens Phases 2&3 Wastewater Treatment System

Mailing Address: 3932 Courtland  
Spokane, WA 99217

Contact: Cheryl Lipinski (owner)

Telephone: (509) 483-0175

**FEE INFORMATION**

Number of Outfalls: 1 (for fee determination only)

Outfall Type: 001 - Subsurface Drainfield

**I. PERMIT STATUS**

This is a new permit for an existing subsurface wastewater treatment system (SWTS) at a residential subdivision.

Construction of the wastewater system requires that the owner or operator apply for a Montana Ground Water Pollution Control System (MGWPCS) permit pursuant to Administrative Rules of Montana (ARM) 17.30.1022(1)(d). The permittee submitted their initial MGWPCS permit application on February 14, 2002. Additional information was requested by the Department on April 22, 2002, and a response was received on January 28, 2003. The application was deemed substantially complete on April 1, 2003. A revised application form was submitted to the Department on July 15, 2004.

The wastewater treatment system received plan and specification approval from the Department on April 3, 2002 (EQ#01-2485).

## II. FACILITY DESCRIPTION

The community wastewater treatment system serves 81 single-family homes in the Belgrade Gardens Phase 2 and 3 subdivision (lots 42 through 101 in Phase 2 and lots 102 through 122 in Phase 3). The wastewater system is used to treat residential strength (domestic) wastewater.

The wastewater treatment system includes individual septic tanks that are located on each lot (the septic tanks will be owned and maintained by the lot owner). The septic tanks remove settleable and floatable solids. The septic tanks effluent is collected via gravity sewer drain and routed via a lift station into one 20,000 gallon dose tank. Final disposal of the treated wastewater is in a four-zone subsurface pressure-dosed drainfield with a footprint of 43,560 ft<sup>2</sup>. The design flow rate for the wastewater treatment system is 24,300 gallons per day (gpd). Discharge from outfall 001 is considered a continuous daily discharge and will occur all months of the year.

The subsurface drainfield is constructed in the West Gallatin River Alluvium which consists of gravels with interbedded layers of sand, silt and clay.

Prior to issuance of a ground water discharge permit, the owner constructed the wastewater treatment system and put the system into operation, which was in violation of 75-5-605(2)(a) Montana Code Annotated (MCA). The Department pursued an enforcement action against the owner and signed an administrative order (AO) with the owner on August 3, 2004. The AO required the owner to submit a revised ground water permit application, updated maps of the subdivision and wastewater system, explanation of how wastewater discharges from businesses were to be limited, design specifications for an effluent flow meter, and specifications for a ground water monitoring system. The AO also required a penalty fee of \$4,000. On August 5, 2004 the Department determined that the Belgrade Commercial Park Corporation had satisfied the requirements of the AO and closed the enforcement case file.

The dimensions and locations of the wastewater treatment system, the drainfield and its associated mixing zone are illustrated in Attachment 1.

## III. DESCRIPTION OF DISCHARGE

### A. Outfall Location

The permit authorizes the permittee to discharge treated domestic wastewater from a drainfield (Outfall 001) to ground water.

The subdivision being served by the wastewater facility is located in the NE ¼, SE ¼, and NW ¼ of Section 34, Township 1 North, Range 4 East, Gallatin County (see Attachment 2).

Outfall 001, the drainfield, is located at 45°47'48'' North latitude (45.7966) and 111°12'14'' West longitude (-111.2039), see Attachment 2.

B. Past Monitoring Data / Effluent Characteristics

1. Past Monitoring Data

The wastewater treatment system has been operational for several years, but no monitoring data has been collected.

2. Effluent Characteristics

The effluent that is discharged after septic tank treatment to a drainfield is expected to have the following average chemical characteristics:

- Total nitrogen (sum of nitrate, nitrite, ammonia and organic nitrogen as N): 50 mg/L (DEQ, 1994)
- Total Phosphorus: 10.6 mg/L (DEQ, 1997)
- Biological Oxygen Demand (BOD): 140-200 mg/L (USEPA, 2002)
- Total Suspended Solids (TSS): 50-100 mg/L (USEPA, 2002)
- Fecal Coliform Bacteria:  $10^6 - 10^8$  organisms (USEPA, 2002)

IV. RECEIVING WATER

A. Water Use Classifications and Applicable Water Quality Standards

Two wells located nearby (well #1) and within the subdivision boundaries (well #2 or well #4B2) were sampled and tested for specific conductance. The two wells had specific conductance concentrations of 428 and 444 umhos/cm, respectively (see Attachment 2 for the locations of the wells). Therefore, the classification of the receiving ground water is Class I.

The receiving water for Outfall 001 is Class I ground water as defined by the Administrative Rules of Montana [ARM 17.30.1006 (1)(a)]. Class I ground water is suitable for the following beneficial uses with little or no treatment: public and private water supplies, culinary and food processing purposes, irrigation, drinking water for livestock and wildlife and for industrial and commercial uses. Secondary and human health standards (WQB-7, January 2004) apply to concentrations of substances in Class I ground waters (water with specific conductance equal to or less than 1,000 microSiemens/cm). Class I ground waters are considered high quality waters and are subject to Montana's Nondegradation Policy [75-5-303, MCA]. The applicable water quality standards and nondegradation significance criteria are shown in Table 1.

**Table 1. Applicable Water Quality Standards and Nondegradation Significance Criteria**

Parameter	WQB-7 Human Health Ground Water Standards	Nondegradation Significance Criteria in Ground Water
Nitrate (as N), mg/L	10	5.0
Total Phosphorus, mg/L	no standard	50 year breakthrough <sup>(1)</sup>
Fecal Coliform Bacteria, organisms/100 ml	<1	<1

(1) The phosphorus significance criteria is listed in ARM 17.30.715(1)(e): "changes in concentration of total phosphorus in ground water if water quality protection practices approved by the department have been fully implemented and if an evaluation of the phosphorus adsorptive capacity of the soils in the area of the activity indicates that phosphorus will be removed for a period of 50 years prior to a discharge to any surface waters."

The nearest downgradient surface water is Cowan Creek. In the direction of groundwater flow (N11°W) Cowan Creek is 10,000 feet downgradient of the drainfield area. Cowan Creek is classified as a B-1 surface water [ARM 17.30.610(1)].

#### B. Mixing Zone

The permittee has proposed to discharge all wastewater from Outfall 001 and has applied for a 500-foot long standard ground water mixing zone. The permittee must comply with the ground water mixing zone rules pursuant to ARM Title 17, Chapter 30, Sub-chapter 5. The permit grants a standard ground water mixing zone extending 500 feet [ARM 17.30.517(1)(d)(viii)(D)] down-gradient of the drainfield in a N11°W direction (parallel to the local ground water gradient). The shape of the mixing zone is determined from the primary and replacement drainfields dimensions, the measured ground water flow direction, and a 5 degree expansion in the downgradient direction to account for lateral dispersion in the aquifer. The ground water mixing zone is granted for nitrate. The permittee has demonstrated that the zone of influence (assumed to be 100 feet) of any existing drinking water well does not intercept the mixing zone.

#### V. PROPOSED TECHNOLOGY-BASED EFFLUENT LIMITS

The total nitrogen (including nitrate, nitrite, ammonia and organic nitrogen) concentration in typical residential wastewater ranges from 40-100 mg/L (EPA, 2002). The Department has historically considered 60 mg/L of total nitrogen an average concentration for raw domestic wastewater. The assumed total nitrogen concentration in the effluent discharged to the ground water for a septic tank/drainfield system is 50 mg/L (10% reduction of the raw wastewater is estimated to occur in the septic tank and an additional 7% of nitrogen removal is assumed to occur within the drainfield). Seven percent (out of the total 17%) of nitrogen removal is assumed to occur within the drainfield, which provides a final total nitrogen concentration discharged to the drainfield of 54 mg/L. Therefore, 54 mg/L nitrate (as N) is the technology-based concentration limit, the corresponding load limit (10.94 lb/day) is based on that concentration and the system's design flow rate of 24,300 gpd (see Table 2).

**Table 2. Technology-Based Effluent Limits for Outfall 001**

<b>Parameter</b>	<b>90-Day Average Concentration<sup>(1)</sup> (mg/L)</b>	<b>90-Day Average Load<sup>(1)</sup> (pounds per day)</b>
<b>Total Nitrogen (as N)<sup>(2)</sup></b>	<b>54</b>	<b>10.94<sup>(3)</sup></b>

(1) See definitions in Part VI. of the permit.

(2) Total Nitrogen (TN) is the sum of nitrate, nitrite and total kjeldahl nitrogen as N.

(3) This value is determined by using the 90-day average concentration limit and the design flow of outfall 001: Load (lb/d) = flow (gpd) x concentration (mg/L) x 8.34x10<sup>-6</sup>.

## VI. PROPOSED WATER-QUALITY BASED EFFLUENT LIMITS

The permittee must comply with Montana Numeric Water Quality Standards included in Circular WQB-7 (January 2004) and protection of beneficial uses [ARM 17.30.1006]. Ground water quality standards may be exceeded within a Department authorized mixing zone, provided that all existing and future beneficial uses of the state waters are protected [ARM 17.30.1005]. In addition, for parameters that do not have human health standards in WQB-7, the discharge may not cause an increase of a parameter to a level that renders the waters harmful, detrimental or injurious to the beneficial uses listed for Class I ground water [ARM 17.30.1006(1)(c)(ii)]. The nonsignificant criteria established under the Nondegradation rules [ARM 17.30.715(1)(g)] prohibits a change in water quality outside the mixing zone, if the change has a measurable effect on any existing or anticipated use or causes a measurable change in aquatic life or ecological integrity.

The Montana Water Quality Act requires that a discharge to state water shall not cause a violation of a water quality standard outside a Department authorized mixing zone. The water-quality based effluent limits have been determined as follows:

### A. Nitrate

The total nitrogen [the sum of nitrate+nitrite (as N) and total kjeldahl nitrogen (as N)] concentration in the drainfield effluent is estimated to determine whether the applicable ground water quality standard or nondegradation limit can be met at the end of the mixing zone. A sensitivity analysis estimates the ground water nitrate+nitrite (as N) concentration at the end of the mixing zone that would result from the discharge. This estimate is derived from a dilution calculation according to the mass balance equation:

$$C_2 = \frac{C_3(Q_1 + Q_2) - C_1 Q_1}{Q_2}$$

where:

C<sub>1</sub> = Ambient (background) ground water nitrate+nitrite (as N) concentration (mg/L).

C<sub>2</sub> = Allowable nitrate (as N) discharge concentration (mg/L).

- $C_3$  = Ground water concentration limit for nitrate (as) [from Circular WQB-7 or other appropriate water quality standard] at the end of the mixing zone  
 $Q_1$  = Ground water volume mixing with the discharge (ft<sup>3</sup>/day).  
 $Q_2$  = Design discharge volume (ft<sup>3</sup>/day).

Hydraulic conductivity of the shallow ground water (740 feet/day) is based on a 24-hour constant rate pumping test conducted for a neighboring subdivision, Vista Meadows (EQ #98-2340). The hydraulic gradient (0.0042 ft/ft N11°W) is based on a USGS ground water map of the Gallatin Valley (Slagle, 1995). The background nitrate (as N) concentration (0.96 mg/L) is based on the higher of two samples collected from well #1 and well #2.

The volume of ground water that will mix with the discharge ( $Q_1$ ) is estimated using Darcy's equation:

$$Q_1 = K I A$$

Where:  $Q_1$  = ground water flow volume (ft<sup>3</sup>/day)  
 $K$  = hydraulic conductivity (ft/day)  
 $I$  = hydraulic gradient (ft/ft)  
 $A$  = cross-sectional area (ft<sup>2</sup>) at the down-gradient boundary of the standard 500-foot mixing zone.

$$Q_1 = (740 \text{ ft/day})(0.0042 \text{ ft/ft})(8,963 \text{ ft}^2)$$

$$Q_1 = 27,857 \text{ ft}^3/\text{day}$$

The design capacity of the wastewater treatment system is 24,300 gpd, or 3,249 ft<sup>3</sup>/day. The area (A) is calculated by the width at the end of the mixing zone (598 feet) times a standard depth in the groundwater of 15 feet. The applicable nitrate (as N) nondegradation limit is 5.0 mg/L at the end of the mixing zone [ARM 17.30.715(1)(d)(ii)]. It is assumed that the entire total nitrogen load in the effluent converts to nitrate and enters the ground water. Mixing the effluent with the underlying ground water gives the following result for the nitrate (as N) concentration at the downgradient edge of the mixing zone:

$$C_2 = \frac{5.0 \text{ mg/L} (27,857 \text{ ft}^3/\text{d} + 3,249 \text{ ft}^3/\text{d}) - [(0.96 \text{ mg/L})(27,857 \text{ ft}^3/\text{d})]}{(3,249 \text{ ft}^3/\text{day})}$$

$$C_2 = 39.6 \text{ mg/L}$$

Therefore, the maximum concentration of total nitrogen discharged to ground water must not exceed 39.6 mg/L at Outfall 001. This effluent limit ensures the nitrate (as N) concentration at the end of the ground water mixing zone will remain at or below the nondegradation significance criteria of 5.0 mg/L. As discussed in Section V, nitrate reduction of approximately 7 percent is assumed to occur beneath the drainfield. Therefore, to discharge a nitrate (as N) concentration of

39.6 mg/L below the drainfield, the WQBEL for Outfall 001 is 42.6 mg/L (the sampling location for Outfall 001 is the dose tank prior to treatment in the drainfield).

The calculated effluent concentration of nitrate (as N) must not exceed 42.6 mg/L in order not to exceed the state water quality standard of 5.0 mg/L at the down gradient boundary of the mixing zone (Part IV). However, the nitrate concentration in the effluent from a conventional septic tank drainfield is typically 50 mg/L (Part V). Because this concentration prediction is based on design flow for the systems and other limitations involved in predicting pollutant transport, such as biological denitrification below the drainfield, the effluent limit will be expressed as a load limit (8.63 lbs total nitrogen per day) based on an annual basis, this load limit is calculated below:

$$\begin{aligned}\text{Load limit (lbs/day)} &= \text{effluent rate (gpd)} \times \text{effluent concentration (mg/L)} \times 8.34 \times 10^{-6} \\ \text{Load limit (lbs/day)} &= (24,300 \text{ gpd}) (42.6 \text{ mg/L}) (8.34 \times 10^{-6}) \\ \text{Load limit} &= 8.63 \text{ lbs/day}\end{aligned}$$

If the nitrate (as N) concentration exceeds the standard (5.0 mg/L) in the ground water at the end of the mixing zone (or if the design flow of the system, 24,300 gpd, is exceeded), a concentration effluent limit of 42.6 mg/L (total nitrogen) will be added to the effluent limits beginning in the reporting period immediately following the exceedence of the nitrate standard/design flow, and the permittee will be required to submit a plan and schedule to upgrade the wastewater treatment system to meet the effluent limit of 42.6 mg/L.

#### B. Fecal Coliform

Fecal coliform monitoring at the down-gradient end of the drainfield is included in this permit because:

- the hydraulic conductivity of the underlying soils is high, which allows relatively rapid movement of bacteria;
- the treatment system does not include disinfection;
- this area is experiencing rapid growth with high density development; and
- the potential to exceed ground water standards

A virus transport study conducted in western Montana revealed a four-log decrease of pathogens when discharged directly into the ground water, but the results are site specific and are dependent on the amount of fine soil present at the site (Woessner, 1998).

The permit will require ground water monitoring near the downgradient end of the drainfield to insure that the WQB-7 human health standard and nondegradation limit (<1 fecal coliform/100 ml) is not exceeded.

### C. Phosphorus

The total phosphorus limitations are imposed to insure that the quality of the effluent meets the nondegradation limit prior to discharge into any surface water [ARM 17.30.715(1)(e)].

Based on the design flow of the system (24,300 gpd) and the anticipated average concentration (10.6 mg/L), the anticipated phosphorus load is 2.15 lb/day (784 lb/year). Using the distance (10,000 feet) from the drainfield to the receiving water, Cowan Creek, the breakthrough time for the phosphorus is 192.5 years. That breakthrough time is considered nonsignificant degradation of state water [ARM 17.30.715(1)(e)].

The phosphorus breakthrough would be 50 years (the level of significant degradation) at an effluent concentration of 40.8 mg/L, or a load of 8.27 lb/day. Therefore, the effluent limit for the total phosphorus load discharged to the drainfield will be set at 8.27 lb/day.

The phosphorus effluent limits do not include a concentration limit because of the method used to determine compliance with the 50 year breakthrough criteria (see footnote (1) of Table 1). The 50-year breakthrough nondegradation criterion is based on the amount of soil available to adsorb the phosphorus between the discharge point and the surface water. The adsorption capacity of the soil is only based on the total load of phosphorus, therefore, a concentration limit is not necessary.

The water-quality based effluent limits for Outfall 001 are summarized in Table 3.

**Table 3. Water Quality-Based Effluent Limits for Outfall 001**

<b>Parameter</b>	<b>Daily Maximum Concentration<sup>(1)</sup> (mg/L)</b>	<b>90-Day Average Load<sup>(1)</sup> (pounds per day)</b>
Total Nitrogen (as N) <sup>(2)</sup>	42.6 <sup>(4)</sup>	8.63 <sup>(3)</sup>
Total Phosphorus (as P)	NA	8.27 <sup>(3)</sup>

(1) See definitions in Part VI. of the permit.

(2) Total Nitrogen (TN) is the sum of nitrate, nitrite and total kjeldahl nitrogen (as N).

(3) This value is determined by using the 90-day average concentration limit and the design flow of outfall 001: Load (lb/d) = flow (gpd) x concentration (mg/L) x  $8.34 \times 10^{-6}$ .

(4) This limit becomes effective if the concentration of nitrate (as N) in monitor well MW-2 (at the end of the mixing zone) exceeds 5.0 mg/L, or if the effluent flow rate exceeds the design capacity (24,300 gpd) in any single reading.

NA Not Applicable

## VII. FINAL PROPOSED EFFLUENT LIMITS

The nitrogen TBEL, which is based on the wastewater treatment system, is 10.94 lb/day for Outfall 001. Based on the mass balance calculation, the total nitrogen WQBEL (8.63 lb/day) is lower than the TBEL. Therefore, the final total nitrogen effluent limit will be based on the more restrictive WQBEL, 8.63 lb/day.

There is no TBEL for phosphorus, therefore the final total phosphorus effluent limit will be based on the WQBEL, 8.27 lb/day.

The proposed final effluent limitations for Outfall 001 are summarized in Table 4.

**Table 4. Numeric Effluent Limits for Outfall 001**

<b>Parameter</b>	<b>Daily Maximum Concentration<sup>(1)</sup> (mg/L)</b>	<b>90-Day Average Load<sup>(1)</sup> (pounds per day)</b>
Effluent Flow Rate, gpd	24,300 max. flow	N/A
Total Nitrogen (as N) <sup>(2)</sup>	42.6 <sup>(4)</sup>	8.63 <sup>(3)</sup>
Total Phosphorus (as P)	NA	8.27 <sup>(3)</sup>

(1) See definitions in Part VI. of the permit.

(2) Total Nitrogen (TN) is the sum of nitrate, nitrite and total kjeldahl nitrogen (as N).

(3) This value is determined by using the 90-day average concentration limit and the design flow of outfall 001: Load (lb/d) = flow (gpd) x concentration (mg/L) x  $8.34 \times 10^{-6}$ .

(4) This limit becomes effective if the concentration of nitrate (as N) in monitor well MW-2 (at the end of the mixing zone) exceeds 5.0 mg/L, or if the effluent flow rate exceeds the design capacity (24,300 gpd) in any single reading.

NA Not Applicable

## VIII. MONITORING REQUIREMENTS

### A. Effluent Monitoring

Effluent monitoring is essential to ensure the effective treatment of the wastewater discharged from the facility. The effluent limits are established to protect the ground water from a change in water quality that would be deemed significant degradation [ARM 17.30.715] or cause a change in beneficial use [ARM 17.30.1006(1)(b)].

At a minimum, upon the effective date of the permit, the constituents in Table 5 shall be monitored at the frequency and with the type of measurement indicated. Samples or measurements shall be representative of the volume and nature of the monitored discharge. Water quality monitoring shall occur from the drainfield dosing tank prior to discharge into the drainfields. The permittee shall submit the location and type of flow monitoring equipment to the Department within 60 days of the effective date of the permit. The measurement method shall be either by recorder or totalizing flow meter; dose counts or pump run-times will not be accepted.

The reporting period for the constituents in Table 5 is quarterly.

**Table 5. Parameters Monitored in the Effluent for Outfall 001 (prior to discharge into the drainfield)**

Parameter	Frequency	Sample Type <sup>(1)</sup>
Effluent Flow Rate, gpd <sup>(2)</sup>	Continuous	Continuous
Total Suspended Solids (TSS), mg/L	Quarterly	Composite
Biological Oxygen Demand (BOD <sub>5</sub> ), mg/L	Quarterly	Composite
Chloride, mg/L	Quarterly	Composite
Total Phosphorus (as P) <sup>(3)</sup> , mg/L	Quarterly	Composite
Nitrate + Nitrite (as N) mg/L	Quarterly	Composite
Ammonia (as N), mg/L	Quarterly	Composite
Total Kjeldahl Nitrogen (as N), mg/L	Quarterly	Composite
Total Nitrogen (as N) <sup>(4)</sup> , mg/L	Quarterly	Calculated
Total Nitrogen (as N), lb/day <sup>(5)</sup>	Quarterly	Calculated
Total Phosphorus (as P), lb/day <sup>(5)</sup>	Quarterly	Calculated

(1) See definitions in Part VI. of the permit

(2) To be measured by a recorder or totalizing flow meter

(3) EPA Method 365.1 or equivalent.

(4) Total Nitrogen (TN) is the sum of nitrate, nitrite and total kjeldahl nitrogen (as N).

(5) See definition of "quarterly average" in Part VI of the permit. This value is determined by the following formula using the 90-day average concentration limit and the measured flow of outfall 001: Load (lb/d) = flow (gpd) x concentration (mg/L) x  $8.34 \times 10^{-6}$ .

Monitoring for TSS and BOD is required for all wastewater systems that receive a MGWPCS permit to ensure the operation efficiency of the system. Technology-based effluent limit guidelines (ELGs) have not been established for domestic waste discharges to groundwater.

#### B. Ground Water Monitoring and Compliance Limits

Ground water monitoring is required for the permit due to the following site-specific conditions:

- the hydraulic conductivity of the underlying soils is high, which allows relatively rapid movement of bacteria;
- the treatment system does not include any form of disinfection;
- this area is experiencing rapid growth with high density development; and
- the potential to exceed ground water standards.

The permittee is required to monitor the ground water near the downgradient edge of Outfall 001 (the drainfield) and on the downgradient edge of the mixing zone for Outfall 001 (see attachment 1 for the approximate well locations). Monitoring will be conducted through the installation of two (2) monitoring wells (MW-1 and MW-2). These two wells shall serve as compliance monitoring points. MW-1 and MW-2 shall be screened approximately from the top of the high ground water table to 15 feet below the low water table. MW-1 should be located within 100 feet of the downgradient end of the drainfield, and MW-2 should be located at the downgradient boundary of the mixing zone.

The parameters to be monitored in MW-1 and MW-2 are listed in Table 6. The reporting period for the constituents in Table 6 is quarterly.

**Table 6. Ground Water Monitoring Parameters for Monitoring Wells MW-1 and MW-2**

Well	Parameter	Frequency	Sample Type <sup>(1)</sup>
MW-1, MW-2	Static Water Level (SWL) (feet below top of casing)	Quarterly	Instantaneous
MW-1	Fecal Coliform Bacteria, organisms/100 ml	Quarterly	Grab
MW-2	Nitrate as N, mg/L	Quarterly	Grab
MW-1, MW-2	Chloride, mg/L	Quarterly	Grab

(1) See definitions, Part VI. of the permit.

The monitoring of chloride is used as an indicator of wastewater impacts, and will be used to assess the effectiveness of the well location in monitoring ground water impacts when the permit is renewed.

The ground water compliance limits for monitoring wells MW-1 and MW-2 are listed in Table 7.

**Table 7. Ground Water Compliance Limits for Monitoring Wells MW-1 and MW-2**

Well	Parameter	Ground Water Quality Limits
MW-1	Fecal Coliform Bacteria, organisms/100 ml	Less than 1
MW-2	Nitrate as N, mg/L	5.0

If monitoring of MW-1 and MW-2 demonstrates that either ground water compliance limit is exceeded as a result of the permitted discharge, the requirements of the Special Conditions in Part V, Section A. of the permit will be implemented.

#### IX. NONDEGRADATION SIGNIFICANCE DETERMINATION

The Department has determined that this discharge constitutes a new source for the purpose of the Montana Nondegradation Policy [75-5-303, MCA; ARM 17.30.702(16)]. The applicable water quality standards for Class I ground water and nondegradation significance criteria are summarized in Table 1. The compliance limits for nitrate (as N) and fecal coliform bacteria in the ground water monitoring wells are based on compliance with the nondegradation limits.

Following ARM 17.30.706(2) the Department has determined whether this proposed activity will cause significant degradation. The Department determined that impacts from the wastewater system will create nonsignificant degradation.

X. INFORMATION SOURCES

ARM Title 17, Chapter 30, Sub-chapter 5 - Mixing Zones in Surface and Ground Water.

ARM Title 17, Chapter 30, Sub-chapter 10 - Montana Ground Water Pollution Control System (MGWPCS) Standards

ARM Title 17, Chapter 30, Sub-chapter 7 - Nondegradation of Water Quality.

Briar, David W. and James P. Madison. Hydrogeology of the Helena Valley-Fill Aquifer System. USGS Water-Resources Investigations Report 92-4023. April 1992.

Circular WQB-7 – Montana Numeric Water Quality Standards, January 2004.

Slagle, Steven E, Geohydrologic Conditions and Land Use in the Gallatin Valley Southwestern Montana, 1992-1993, USGS, Water Resources Investigation Report, 95-4034, 1995.

Stanford, J.A., T.J. Stuart and B.K. Ellis, Limnology of Flathead Lake: Final Report, University of Montana Biological Station, December 1983.

USEPA, Office of Water 4304, Drinking Water Regulations and Health Advisories, EPA 822-B-96-002, October 1996.

USEPA, Manual: Guidelines for Water Reuse, EPA/625/R-92/004, September 1992.

USEPA, Onsite Wastewater Treatment Systems Manual, February 2002.

Woessner, Wm. W., Thomas, Troy, Ball, Pat and DeBorde, Dan C., (April 1998), Virus Transport in the Capture Zone of a Well Penetrating a High Hydraulic Conductivity Aquifer Containing a Preferential Flow Zone: Challenges to Natural Disinfection. University of Montana, Missoula, Montana.

**Prepared by:** Eric Regensburger

**Date :** February 2006